



MOTORS

Repair Instructions

DR 640 Series Orbital Motors



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Chapter 1

DR 640 Series Exploded View

DR 640 Exploded View

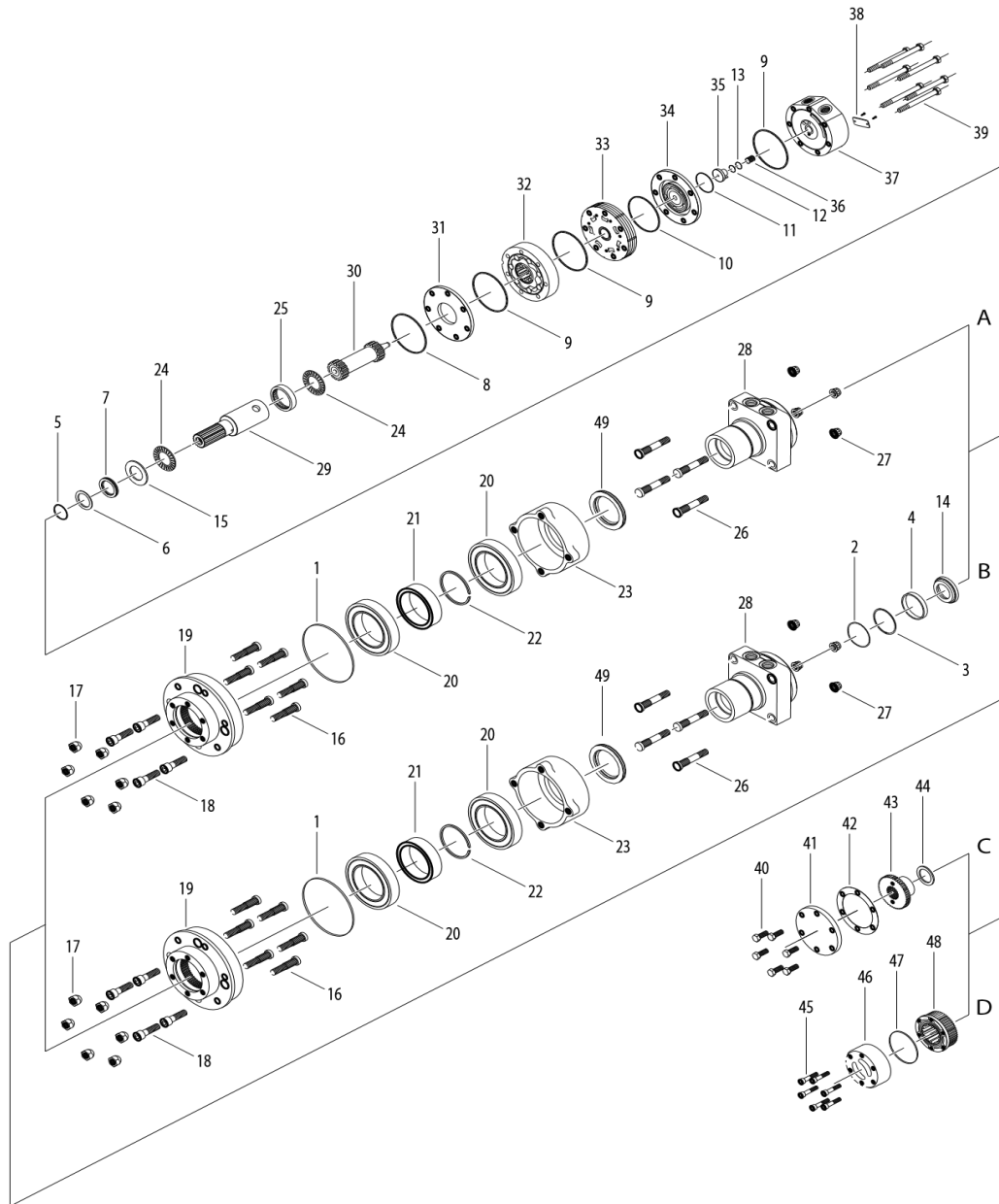


Figure 1: DR 640 Exploded View

Description	Option Letter
Design without seal carrier	A
Seal carrier design	B
Direct drive option	C
Locking hub option	D

Table 1: Options

Description	Item Number	Description	Item Number
Flange seal	1	Planetary mount stud	26
Wire ring	2	Mounting nut	27
Metal backup shim	3	Housing	28
High pressure seal	4	Shaft	29
Metal backup shim	5	Drive link	30
Backup seal	6	Divider plate	31
Shaft seal	7	Rotor assembly	32
Housing seal	8	Manifold	33
Body seal	9	Commutator assembly	34
Manifold seal	10	Endcover piston	35
Commutator seal	11	Piston spring	36
O-ring seal	12	Endcover	37
Backup seal	13	ID tag	38
Seal carrier	14	Assembly bolt	39
Thrust washer	15	Driver cover screw	40
Stud	16	Driver cover	41
Lug nut	17	Paper gasket	42
Capscrew	18	Driver	43
Wheel flange	19	Spacer	44
125mm bearing	20	Screw	45
Bearing spacer	21	Locking hub	46
Thrust ring	22	Wire ring	47
Bearing hub	23	Locking hub spline assembly	48
Thrust bearing	24	Dust seal	49
Rear housing bearing	25		

Table 2: Components list

Note: The motor design that utilizes a seal carrier will use the larger O.D. backup seal and shaft seal.

Chapter 2

DR 640 Series Service Instructions

Topics:

- DR 640 Disassembly
- DR 640 Housing/Shaft with Seal Carrier Disassembly & Assembly
- DR 640 Housing/Shaft Assembly without Seal Carrier Disassembly & Assembly
- RE 540/541 Motor

dimensions: mm [in]

Note: In December 2006, the 640 series incorporated a design change. This set of instructions will aid in the disassembly and assembly for both designs.

Please refer to the exploded view drawing to determine which design is being repaired and follow the appropriate instructions for that design.

The 640 Series is available with either a direct drive option or a locking hub option. After determining which option you have, use the appropriate instructions.

Housing and body seals on products manufactured after July 1, 2016 are o-ring seals. Prior to this date these seals were square cut seals. It is recommended that if the product being serviced has square seals to replace with the square seals in this kit, likewise if the product has o-ring seals, replace with the o-ring seals in this kit.

DR 640 Disassembly

DR Direct Drive Option Disassembly (Uses items 40-44)

Remove six bolts (40) from end cap (41). Lift end cap (41) off of wheel flange (19). Peel or scrape paper gasket (42) off of end cap and/or wheel flange (19). If grease is between end cap (41) and driver (43), remove grease. Screw a 1/4-20 bolt (not included) into one of the two threaded holes in the driver (43) and lift the driver out of the wheel flange (19). If grease is between driver (43) and housing pilot (28), remove grease. If spacer (44) did not come out with driver (43), remove it at this time and lay aside.

DR 640 Locking Hub Option Disassembly (Uses items 45-48)

Remove six screws (45) from locking hub (46). Lift locking hub (46) off of wheel flange (19). Remove wire ring (47). Install two screws (45) in opposite holes in the locking hub splined assembly (48) and use to lift locking hub spline assembly (48) out of wheel flange (19). If grease is between locking hub spline assembly (48) and housing (28) pilot, remove grease. Lay parts aside.

Note: The two bearings (20) are Loctited to bearing hub (23), wheel flange (19) and housing pilot (28). The four capscrews (18) are also Loctited. It is not necessary to remove these components to install this seal kit in the motor. Unless the bearings are damaged, it is not recommended to disassemble of these components. If damage has occurred to the bearings, it is recommended to return the unit to the factory for service, however dust seal (49) is included in this kit in the event the bearing hub is disassembled despite the recommendation listed above.

DR 640 Motor Section General Disassembly (Same Instructions For Both Designs & Drive Options)

1. To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover (37) to the housing (28) using either paint or a marker. With hub facing down, secure

motor in vise by clamping on to housing (28). Loosen and remove seven bolts (39) holding motor assembly together. Remove endcover (37) carefully as piston (35) and spring (36) may fall out. If piston does not come out, carefully pry piston (35) out of endcover (37) and lay aside. Remove O-Ring seal (12) and backup seal (13) from endcover and discard seals. Remove spring (36) and lay aside.

2. Lift commutator container and commutator (34) from motor and lay aside. Place commutator on a flat clean surface with the seal (11) facing up. Place the tip of a small screwdriver on the seal (11) and gently tap until opposite side of seal lifts from groove. Remove seal and discard.
3. Remove manifold (33), rotor set (32) and divider plate (31) from motor. Remove all seals (8, 9, & 10) from components and discard. Caution - Do not allow rolls to drop from rotor assembly (32) when removing rotor assembly from motor. Remove drive link (30) and thrust bearing (24) from motor and lay aside. Remove shaft (29) from housing (28).

DR 640 Housing/Shaft with Seal Carrier Disassembly & Assembly

Design that utilizes a seal carrier (14)

1. Remove housing (28) from vise and place on a clean flat surface with hub end facing up. Using shaft (29) and a rubber mallet, tap seal carrier (14) down to expose wire ring (2). Using a long, narrow shaft screwdriver pry out wire ring (2), metal backup shim (3) and high pressure seal (4) and discard. Remove seal carrier (14), thrust washer (15) and thrust bearing (24) and lay aside.
2. Using a small, flat bladed screwdriver, carefully pry shaft seal (7), backup seal (6) and metal backup shim (5) from seal carrier (14) and lay aside. Lay seal carrier (14), thrust washer (15) and thrust bearing (24) aside.

Note: At this point, all parts should be cleaned in an oil-based solvent and dried using compressed air. For safety, observe all OSHA safety guidelines. All new seals should be lightly coated in clean oil prior to installation.

3. Place shaft on a clean surface with output end facing up. Install thrust bearing (24) and then thrust washer (15) onto shaft. After coating shaft seal (7) with a light coat of oil, place installation sleeve over shaft and push shaft seal onto shaft (lip facing down) until it contacts thrust washer. Remove installation sleeve and lightly coat backup seal (6) with clean oil. Install backup seal (6) with lip facing down followed by metal backup shim (5). See shaft stack up using seal carrier below for correct seal position. Install seal carrier (14) onto shaft with large end facing down. Using a sleeve and press, gently press seal carrier (14) down to compress seal assembly (5-7) into seal carrier (14).

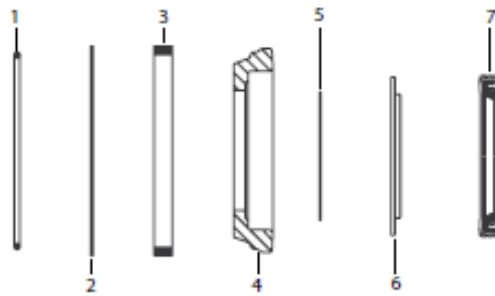


Figure 2: Correct seal orientation

1. Wire ring
 2. Backup shim
 3. High pressure seal
 4. Seal carrier
 5. Backup shim
 6. Backup seal
 7. Shaft seal
4. Place housing (28) on clean, flat surface with pilot facing up. Place spacer under housing (28) to prevent shaft (29) from dropping to work surface. Spacer should allow shaft to be about 13 [.50] below rear surface of housing.
 5. Place shaft/shaft seal assembly into housing (28) with output end facing up. Install high pressure seal (4) into groove in inner bore of housing (28). Install metal backup shim (3) against high pressure seal (4) by squeezing the shim (3) between thumb and forefinger to bow shim. While maintaining bow in shim, start the shim into the groove and use a small screwdriver to push the shim into groove. Install wire ring (2) into groove making sure that the ends are butted.
 6. While holding shaft into housing, secure housing/shaft assembly in vise with shaft end down. Install drive link (30) into shaft and gently tap drive link (30) down to seat seal carrier (14) against wire ring (2). Place thrust bearing (24) over drive link and onto rear surface of shaft (29). If shaft (29) is seated properly against wire ring (2), the thrust bearing (24) should be flush with rear surface of housing (28).

DR 640 Housing/Shaft Assembly without Seal Carrier Disassembly & Assembly

Design that does NOT utilizes a seal carrier (14)

1. Position the housing (28) in vise and use a slide and hammer type bearing puller to remove the rear housing bearing (25). Remove the thrust washer (15) and thrust bearing (24) and set aside. Using a small screwdriver carefully pry the shaft seal (7), backup seal (6) and metal shim (5) from housing bore and discard.
2. Remove the housing from vise and turn over and pry the dust seal (1) from housing and discard.

Note: At this point, all parts should be cleaned in an oil-based solvent and dried using compressed air. For safety, observe all OSHA safety guidelines. All new seals should be lightly coated in clean oil prior to installation.

- Place housing (28) in vice with the seven bolt assembly holes facing up. Place metal shim (5) in the smallest diameter recess in the housing (28). Install the backup seal (6) into the housing (28) with the flat side down and the seal lip facing up. Insert shaft seal (7) down into housing (28) making sure that lip on seal faces up. See below for correct seal orientation on designs without seal carrier (14).

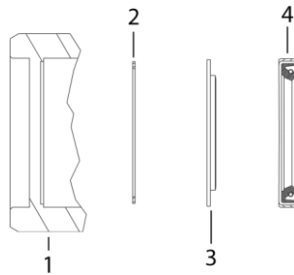


Figure 3: Seal orientation on designs without seal carrier

- Housing
 - Metal backup shim
 - Backup seal
 - Shaft seal
- Place the rear housing bearing (25) onto the rear housing bore and press to a depth of 58.4 [2.3] from the rear surface of the housing (28) to the top of the bearing (25). Place the shaft (29) down into housing (28) and place thrust bearing (24) on top of shaft (29). If shaft seals are properly seated against the housing (25), thrust bearing (21) will be flush with rear surface of housing.

DR 640 Motor Section Assembly

DR 640 Motor Section General Assembly (Same instructions for both designs & drive options)

- Install housing seal (8) into groove in housing (28). Place divider plate (31) onto housing (28) aligning bolt holes. Place body seals (9) in grooves in both sides of rotor (32). Place rotor (32) onto divider plate (31) with side of rotor with chamfer in splines facing divider plate (31). Place manifold (33) onto rotor (32) with seal groove side up. Install manifold seal (10).
- Install the commutator seal (11) into the commutator (34) with the metal side facing up. Use finger pressure to press the seal down flush with the surface of the commutator. Place the commutator container onto the manifold (33) and then place the commutator onto the protruding end of the drive link (30) making sure that the seal side faces up.
- Install the remaining body seal (9) in the groove in the face of the endcover (37). Install piston spring (36) into endcover (37), then the white backup seal (13) followed by the O-ring seal (12). Lining up the alignment pin with the hole in the endcover, press piston (35) into the endcover (37). While holding the piston (35) in the endcover (37), lower the endcover assembly onto the motor. Check to make sure that the endcover ports are in their original position.
- Install the seven assembly bolts (39) and pre-torque to 13.6 Nm [10 ft-lb]. Final torque all bolts to 69.8 ± 7.5 Nm [51.5 ± 5.5 ft-lb] using a crisscross pattern.

DR 640 Direct Drive Option Assembly (Uses items 40-44)

Place spacer (44) over shaft (29). Place driver (43) over shaft (29) while rotating wheel flange (19) slightly to allow splines to mate. Place paper gasket (42) onto wheel flange (19). Reapply grease between driver (43) and end cap (41) only if end cap (41) does not have a grease fitting. Place end cap (41) onto wheel flange (19). Install six bolts (40) and torque to 69.8 ± 7.5 Nm [51.5 ± 5.5 ft. lb.] using a crisscross pattern. If end cap (41) has grease fitting, apply grease.

DR 640 Locking Hub Option Assembly (Uses items 45-48)

Place locking hub spline assembly (48) into wheel flange (19) while rotating wheel flange (19) slightly to allow splines to mate. Install wire ring (47). Align screw holes of locking hub (46) with screw holes in locking hub spline assembly (48) and gently press together. Install six screws (45) into locking hub (46) and torque to 3.3 ± 0.2 Nm [29 ± 2 in-lb].

Chapter 3

DR 640 Series Parts Listing

Description	Exploded View Item Number	Qty. In Kit	Order Number
Flange seal	1	1	700666252 (Includes item numbers 1-13, 42 & 49)
Wire ring	2	1	
Metal backup shim	3	1	
High pressure seal	4	1	
Metal backup shim	5	1	
Backup seal	6	2	
Shaft seal	7	2	
Rear housing seal	8	1	
Body seal	9	3	
Manifold seal	10	1	
Commutator seal	11	1	
O-ring seal	12	1	
Backup seal	13	1	
Paper gasket	42	1	
Dust seal	49	1	
Seal carrier	14	1	500444003(Includes item numbers 14 & 15)
Thrust washer	15		

Table 3: Seal kits

Description	Exploded View Item Number	Qty. In Kit	Order Number
Stud	16	1	500018081
Lug nut	17	1	500018151
Capscrew	18	4	500018086
Wheel flange	19	1	500013035
125mm bearing	20	1	500018095
Bearing spacer	21	1	500018194
Thrust ring	22	1	500018062

Bearing hub	23	1	500013055
Thrust bearing	24	1	500018059
Rear housing bearing	25	1	500018002
Planetary mount stud	26	1	500018081
Mounting nut	27	1	500018112
Divider plate	31	1	500012004
Manifold	33	1	700668002
Commutator assembly	34	1	700668003
Endcover piston	35	1	700668004
Piston spring	36	1	700018046
Drive cover screw	40	6	500018085
Driver cover	41	1	700018001
Driver	43	1	500018179
Thrust washer	44	1	500018114
Locking hub assembly	45-48	1	500018099

Table 3: Miscellaneous kits

When changing motor displacements, a matching rotor, drive link and bolt set kit must be ordered.

Exploded View Item Number	32	32	30	39
Displacement	Standard Rotor Kit	Freeturn Rotor Kit	Drive Link Kit	Bolt Set Kit
200	500167004	500167011	600140012	700664012
260	500227000	500227004	600140016	700664019
300	500247005	500247011	600140019	700664025
350	500207000	500207004	600140027	700665028
375	500307005	500307011	600140025	700664028
470	500357003	500357005	600140027	700665028
540	500407005	500407011	600140033	700665033
750	500607005	500607011	600140046	700665046

Table 4: Rotor, drive links and spacer and bolt kits

Exploded view item #28

Standard housing kits include rear housing bearing(#25) installed in the housing.

Description	Order Number
#W2 & W8 - 4 Hole wheel mount	500131023

Table 5: Housing kits

Exploded view item #29

Description	Shaft Kit
#24- 19 Tooth spline	500011102

Table 6: Internal shaft

Exploded view item #37

Endcover kits come assembled with exploded view items 12, 13, 35 & 36

Code	Description	Standard Endcover	Relief Port Endcover	Internal Drain Endcover	Internal Drain & Relief Port Endcover
1	7/8-14 UNF Rear Ports	700160000	700160000R	700160000D	700160000DR
2	G ¾ Radial side ports	700160007	700160007R	700160007D	700160007DR
3	11/16" Drilled aligned manifold side ports	N/A	N/A	700160003D	N/A
5	1 1/16-12 UN Radial side ports	700160005	700160005R	700160005D	700160005DR
6	1 1/16-12 UN Aligned side ports	700160008	700160008R	N/A	N/A
7	G ¾ Aligned side ports	700160009	N/A	N/A	N/A

Table 6: Endcover kits



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